The information has been stored in computer data files in the Bioelectromagnetics Research Laboratory, and the results for any given exposure situation can be quickly retrieved by the interactive computer programs. In Fig. 7 is illustrated a typical page of the index as seen by the data analyst for such a file representing a block of 235 processed thermograms taken over a period of one month. There were two thermograms corresponding to each image. The first was a scan of the cross section of an unfilled model (Fig. 8). The boundary edges were heated so as to highlight the edges of the region filled with synthetic tissue. The exact coordinates of curve defining the boundary, obtained by direct measurement, were stored in the computer. Through an interactive program, with a light pen, one could fit this curve to the thermographic image of the highlighted unfilled model and stored in the computer for later use in the analysis (Fig. 9). The computer-fitting eliminated any error due to changes of image size or shape due to variation with distance between the thermographic camera and the object or as a result of camera lens aberration.

After establishment of the boundary has been established (Fig. 9), the desired image corresponding to defined boundaries of the processed thermogram was brought onto the screen from the file (Fig. 10). An interactive command placed the boundary around the image. Another interactive command enabled the analyst to touch any point on the image with the light pen; then the pixel column number, row number, SAR per mW/cm^2, and temperature change for the actual measurement would be displayed at the bottom of the screen (Fig. 11). Another command displayed on the screen a complete horizontal and vertical scan (Fig. 12) of the SAR. Through any point touched by the light pen, the computer gave the mean, maximum, average, and standard deviation of the SAR along the scan. Finally, for more accuracy, another command enabled movable crosshairs (Fig. 13) to be used for selection of points or scans. Any information of interest could be placed in separate files or printed in hard-copy form as described previously.

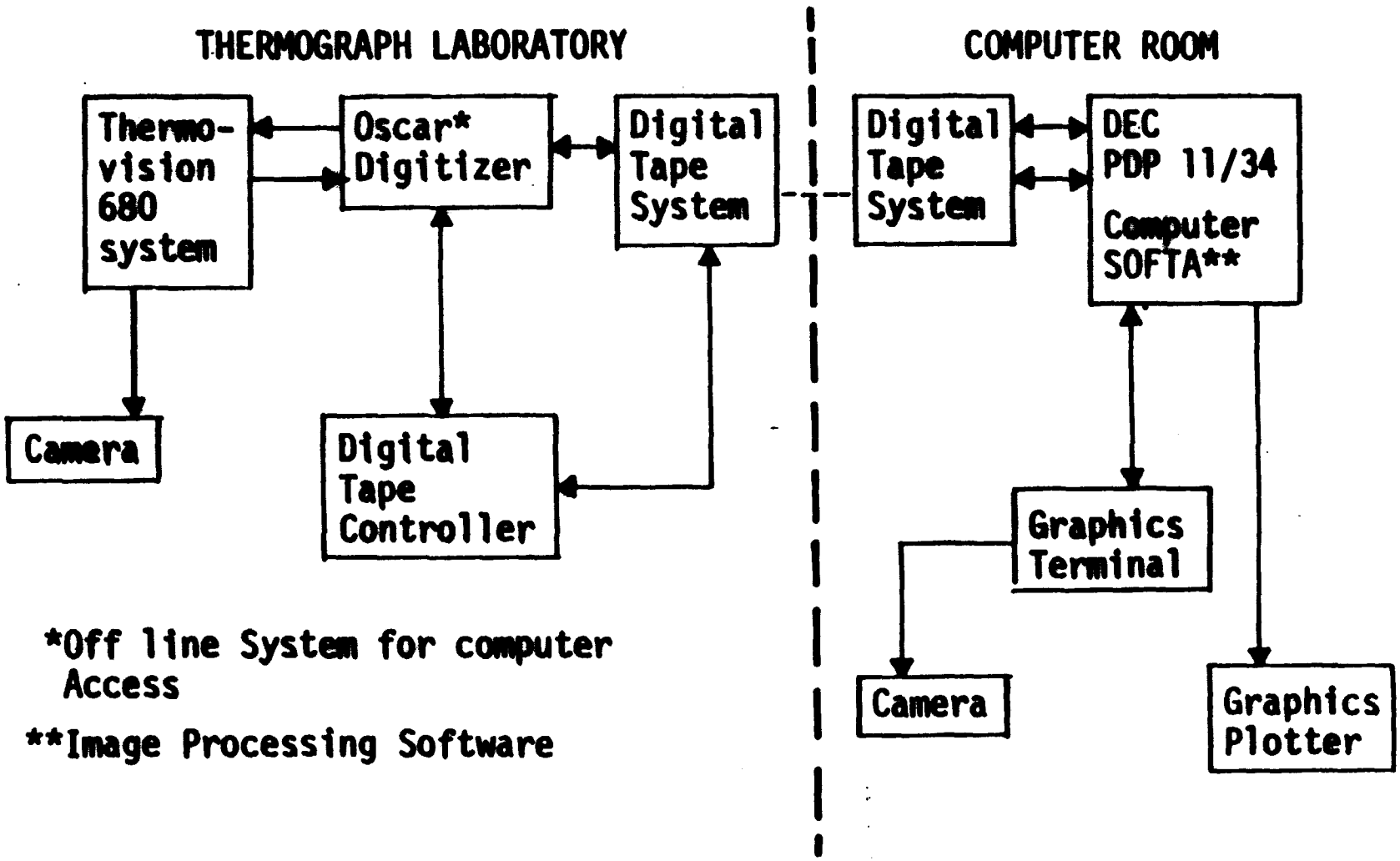

Fig. 1. Block diagram of digitized thermography system.

Fig. 2. Photograph of digitized thermography system; the data are stored in magnetic tapes.

Fig. 3. Transfer of data from magnetic tapes to DEC 11/34 computer system.

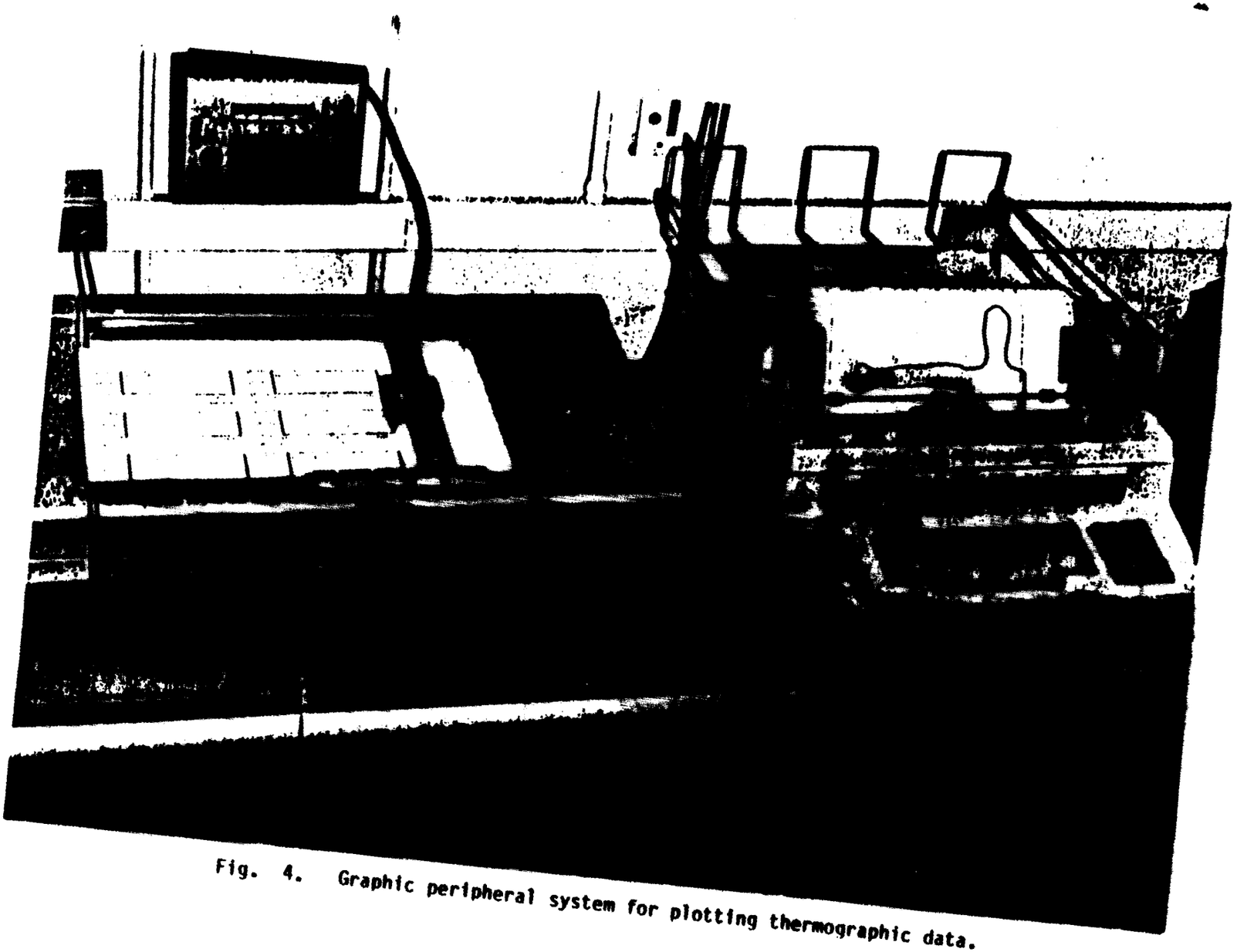

Fig. 4. Graphic peripheral system for plotting thermographic data.

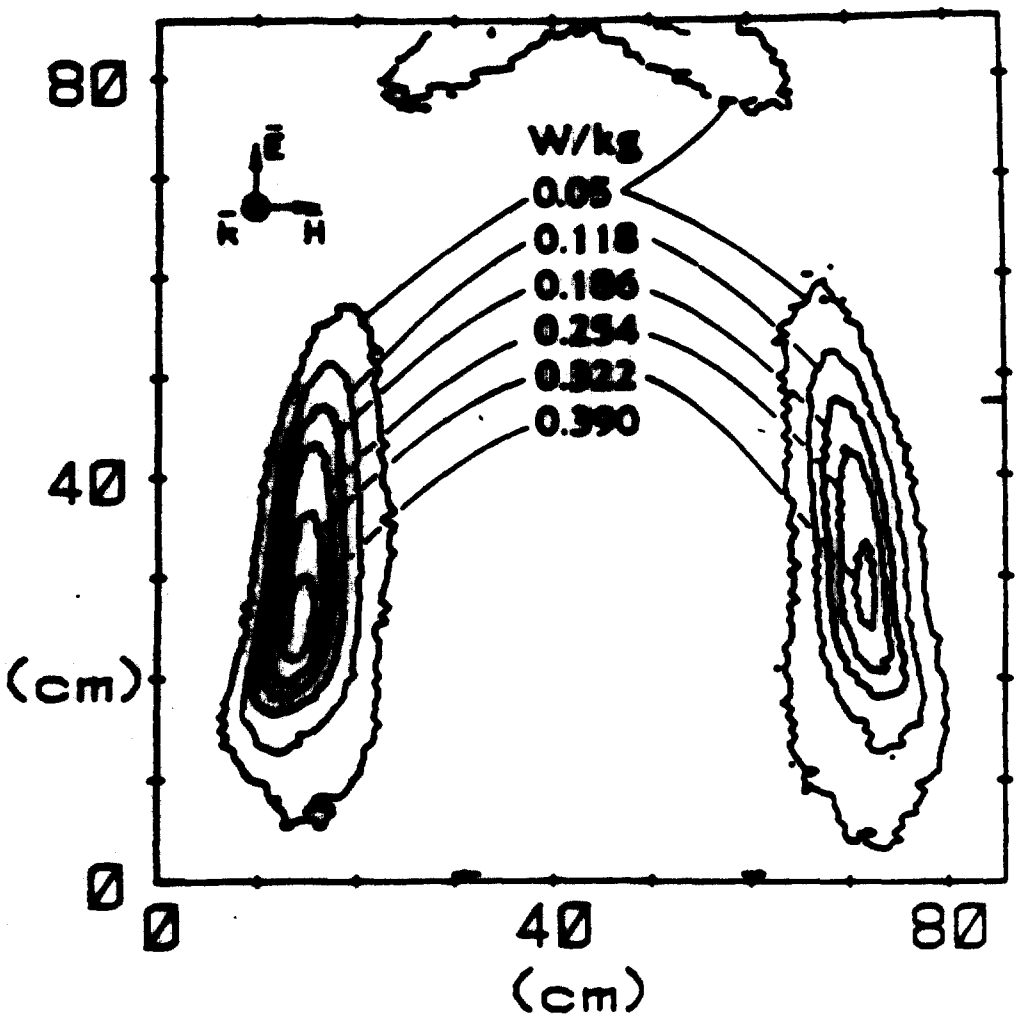

Fig. 5. Computer-processed contour plot of SARs for model man (sf = 5.44) exposed to EHK-polarization, electromagnetic radiation, P_{inc} = 1 mw/cm^2, f = 450 MHz (Middle body closeup).

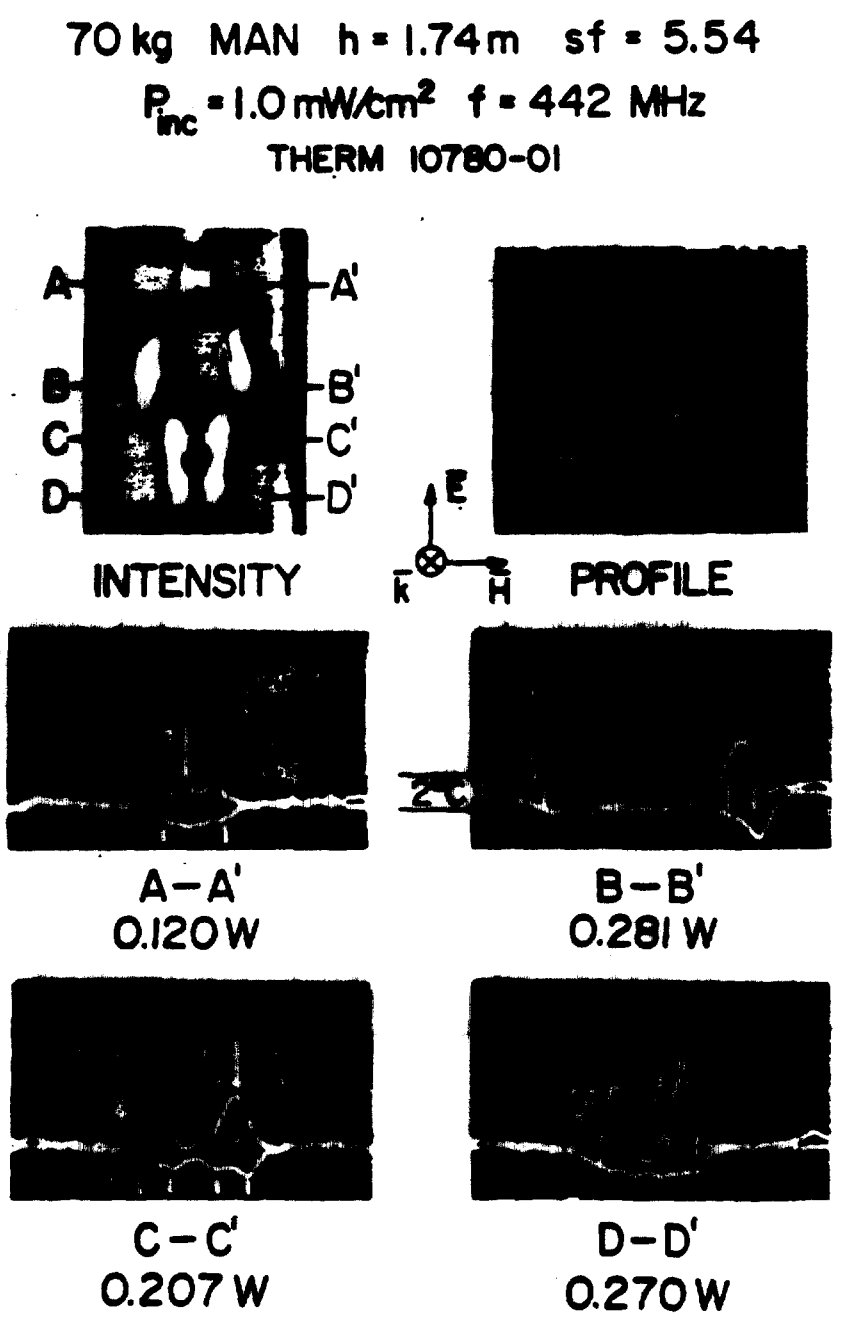

Fig. 6a. Conventional thermograms for thermograph indicator showing SARS (W/kg) for model man (sf = 5.44) exposed to EHK-polarization, electromagnetic radiation, P_{inc} = 1 mW/cm², f = 450 MHz.

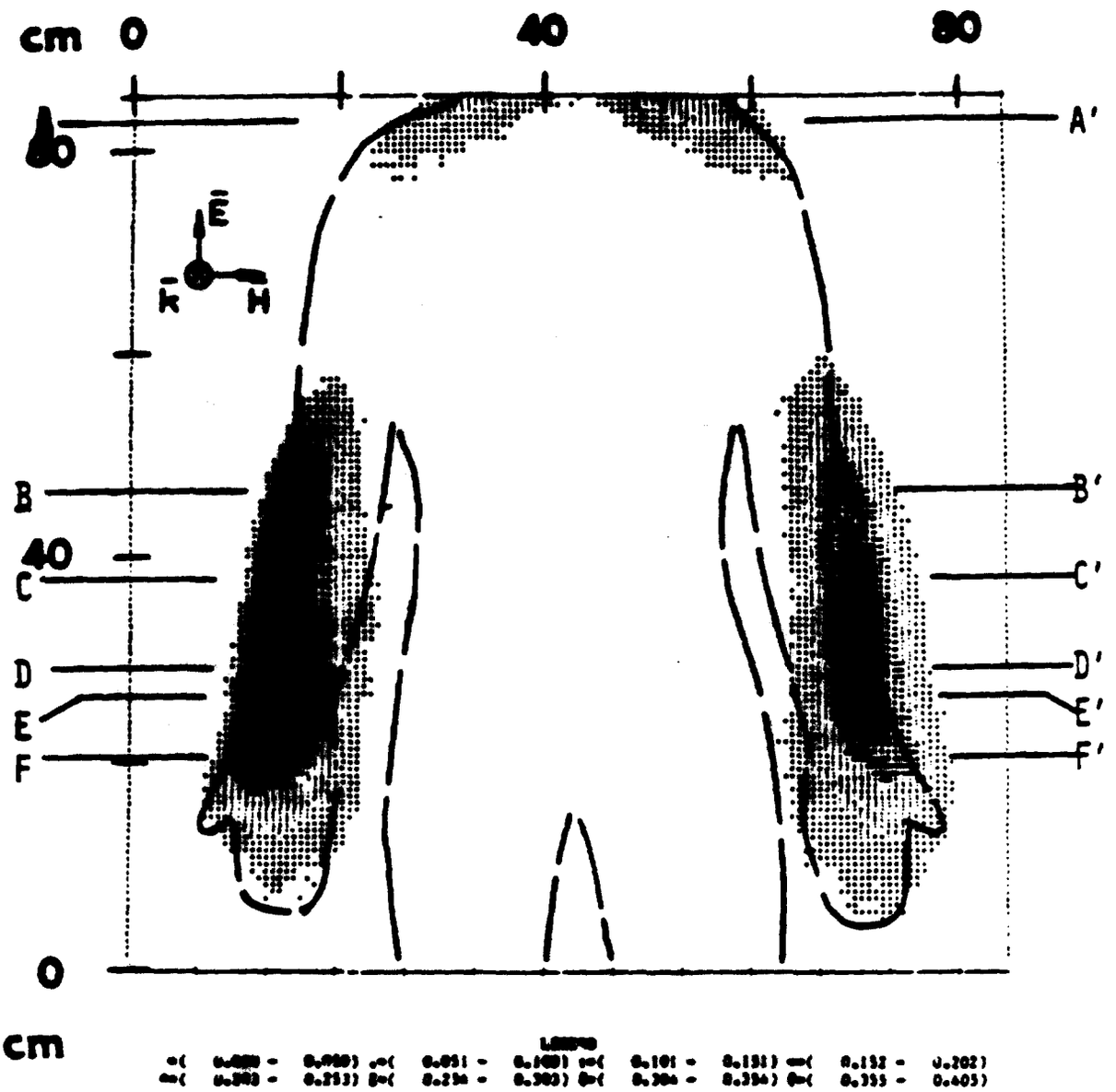

Fig. 6b. Computer-processed gray-scale plot of SARs for model man (sf = 5.44) exposed to EHK-polarization, electromagnetic radiation, P_{inc} = 1 mW/cm^2, f = 450 MHz (Middle body closeup).

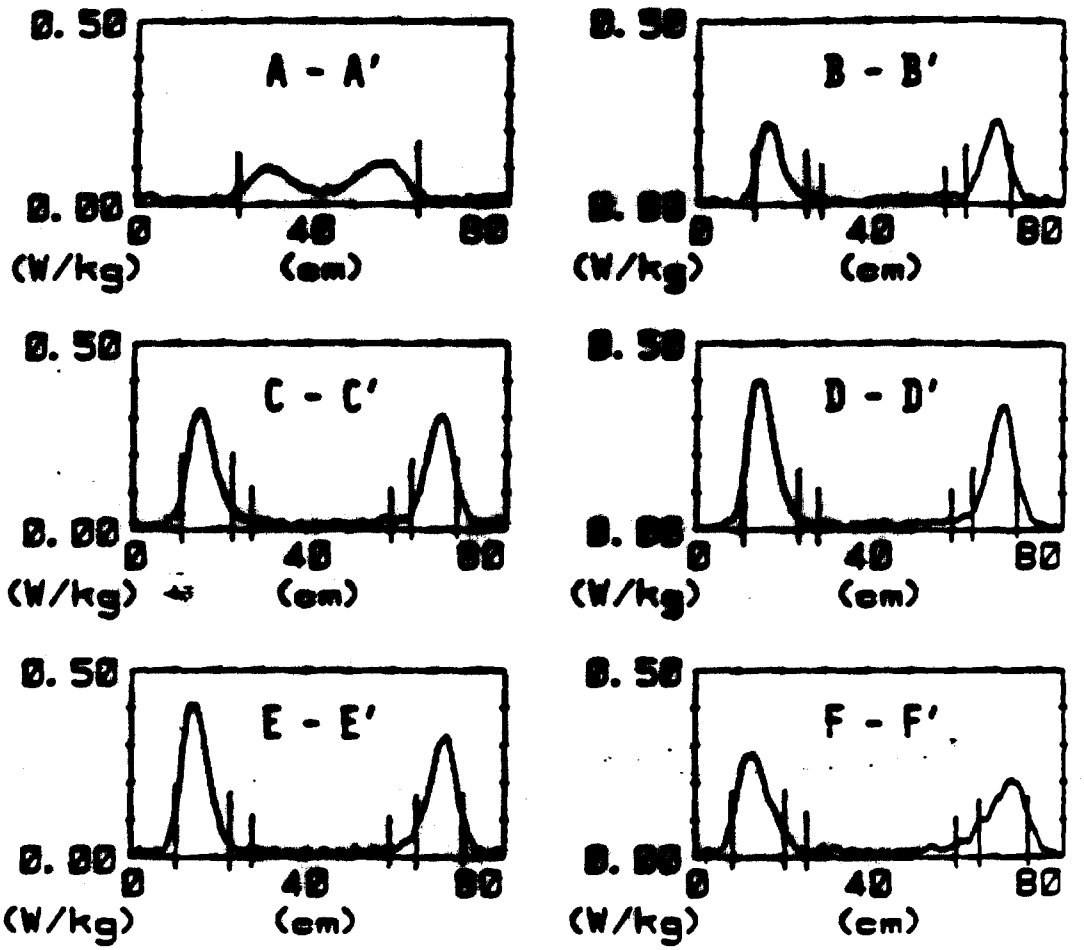

Fig. 6c. Computer-processed single-profile scans (vertical lines denote body boundaries) of SARs for model man (sf = 5.44) exposed to EHK-polarization, electromagnetic radiation, P_{inc} = 1 mw/cm^2, f = 450 MHz (Middle body closeup).

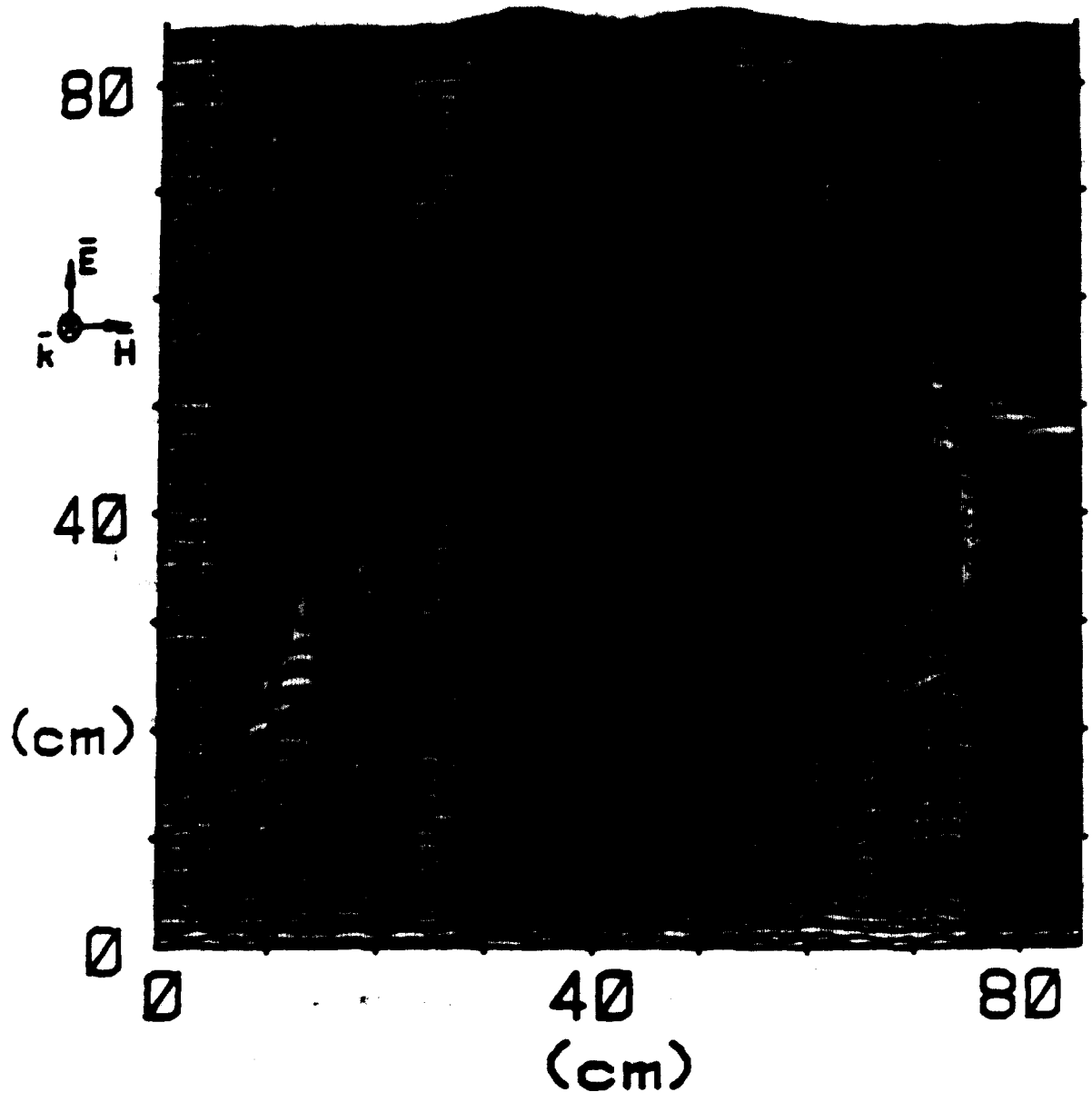

Fig. 6d. Computer-processed multipe-profile scan (vertical deflection proportional to SAR) of SARs for model man (sf = 5.44 exposed to EHK-polarization, electromagnetic radiation, P_{inc} = 1 mW/cm^2, f = 450 MHz (Middle closeup).

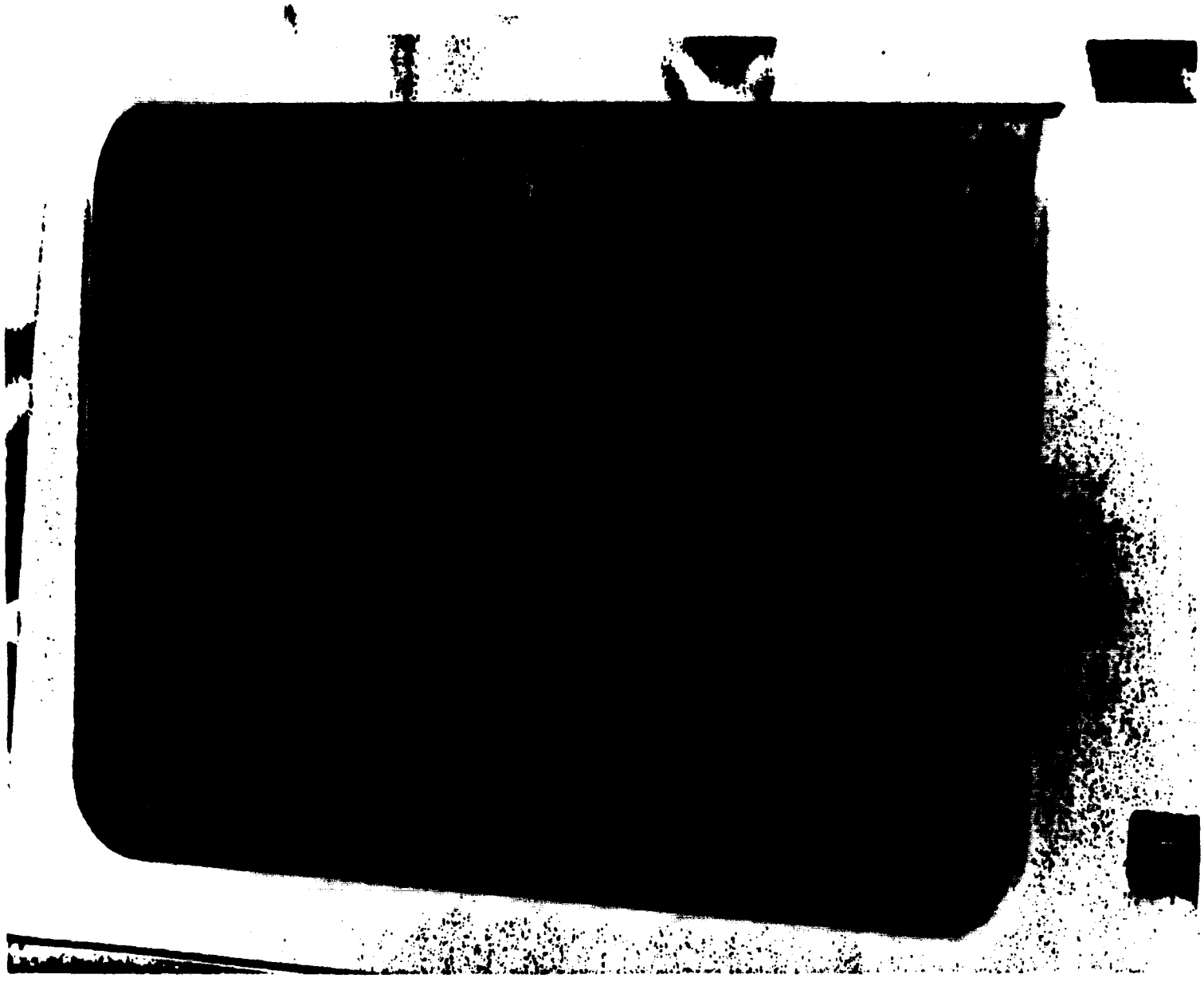

Fig. 7. Computer retrieval of first index page of large thermograph-image-data file.

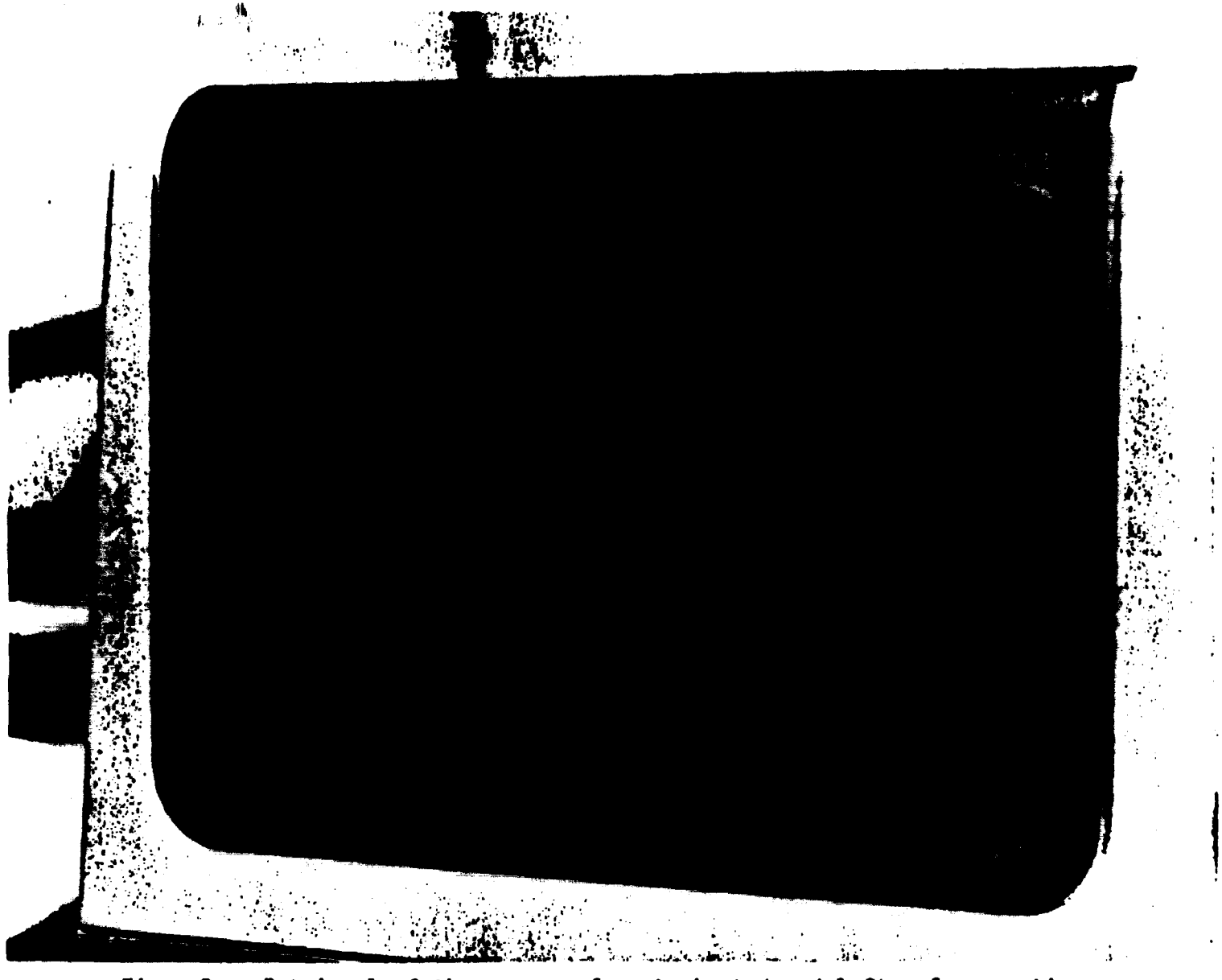

Fig. 8. Retrieval of thermogram of empty heated model Styrofoam section for boundary fitting.

Fig. 9. Boundary properly fitted to thermogram image of empty heated model.

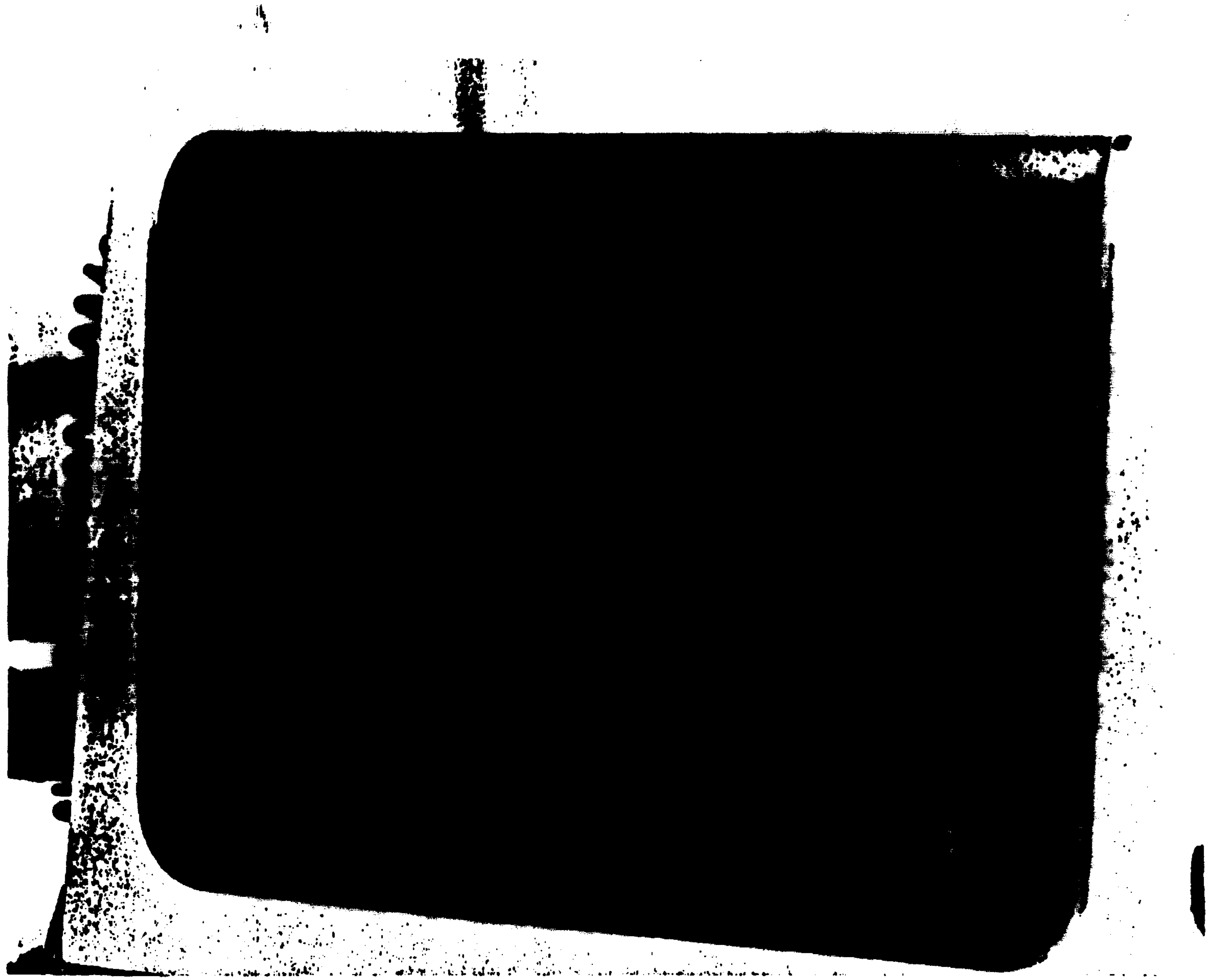

Fig. 10. Retrieval of computer-processed SAR patterns with boundary of man.

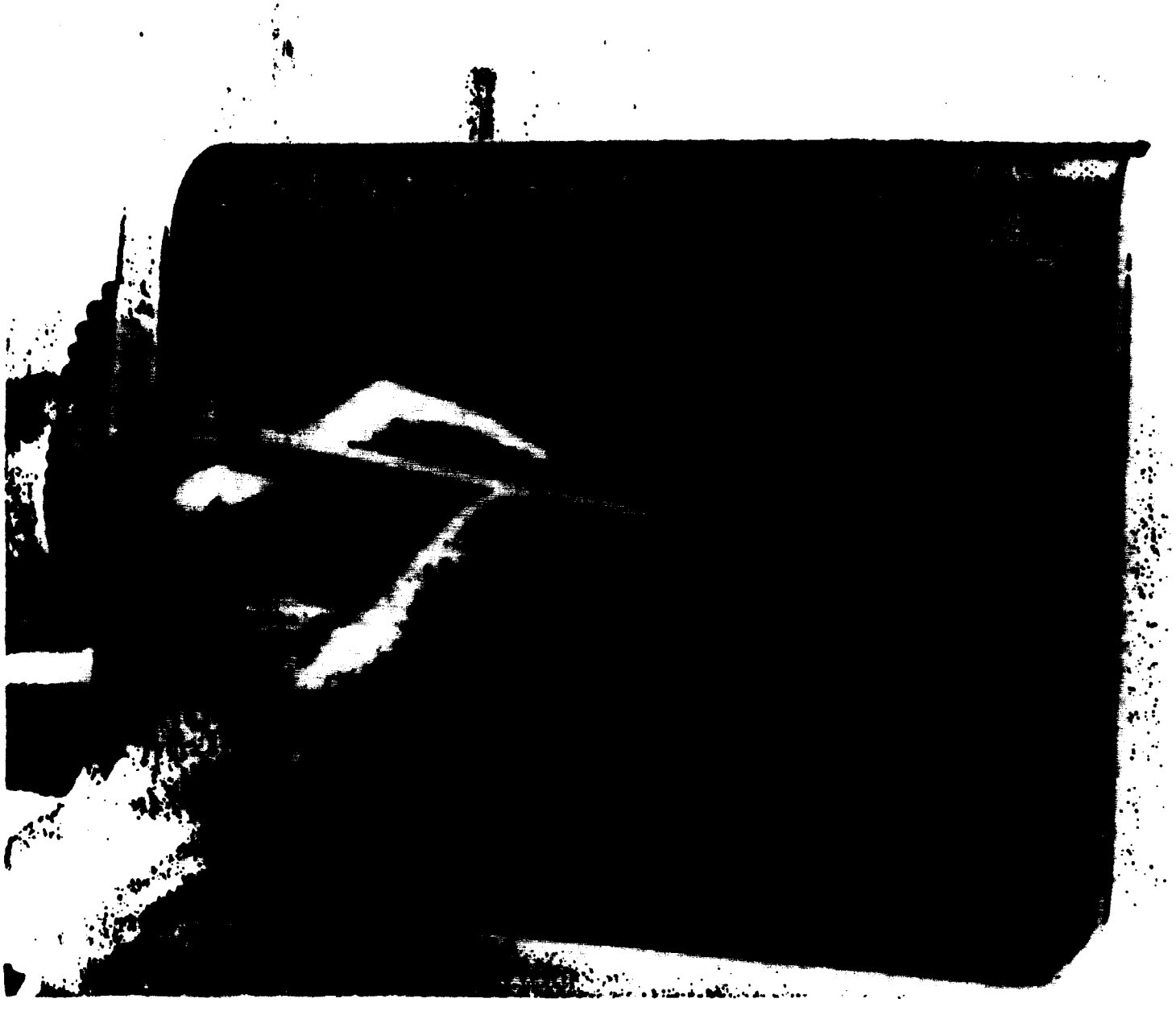

Fig. 11. Light-pen selection of point on image where SAR information is desired.

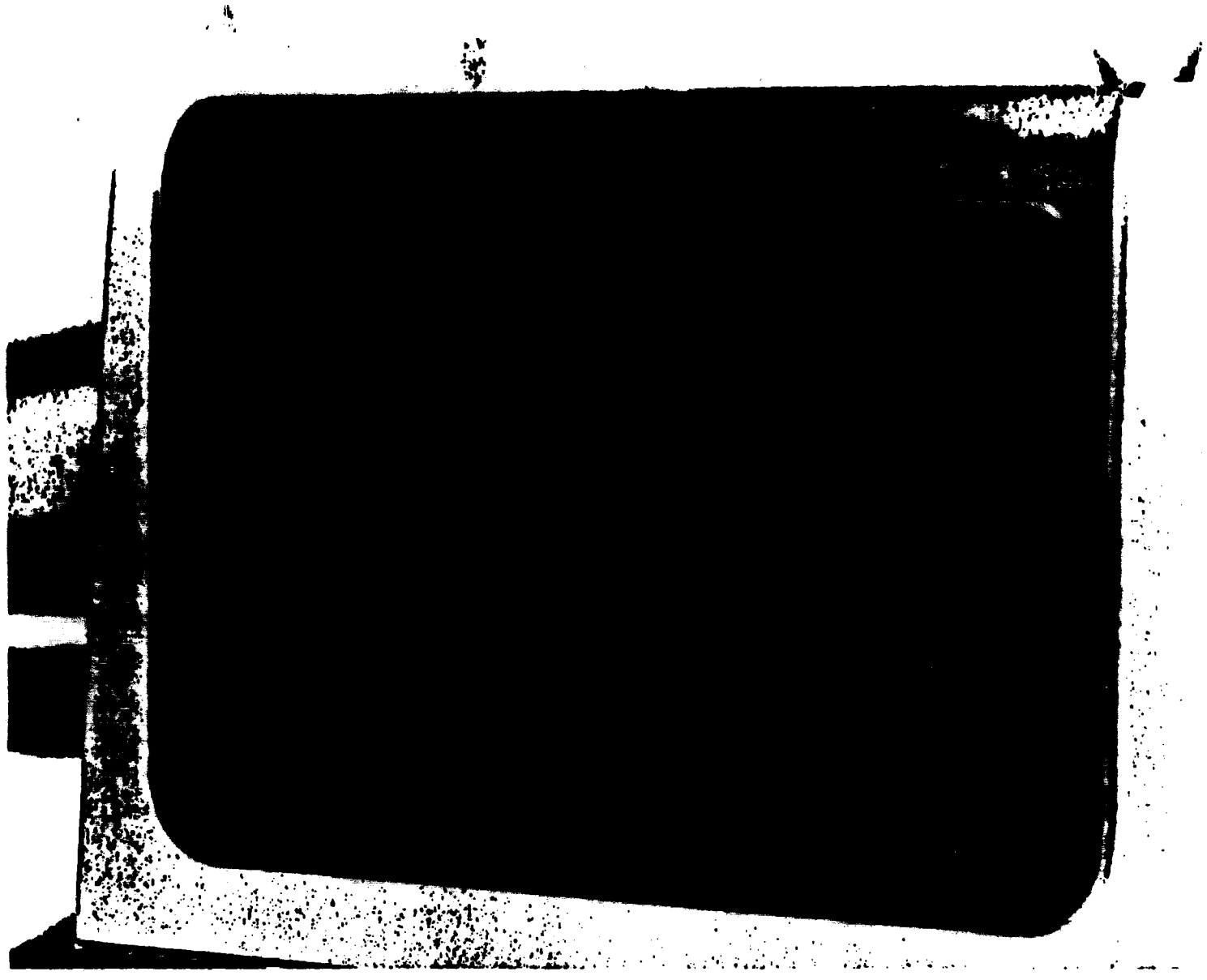

Fig. 12. Light-pen selection of point on image where horizontal and vertical SAR scans are desired.

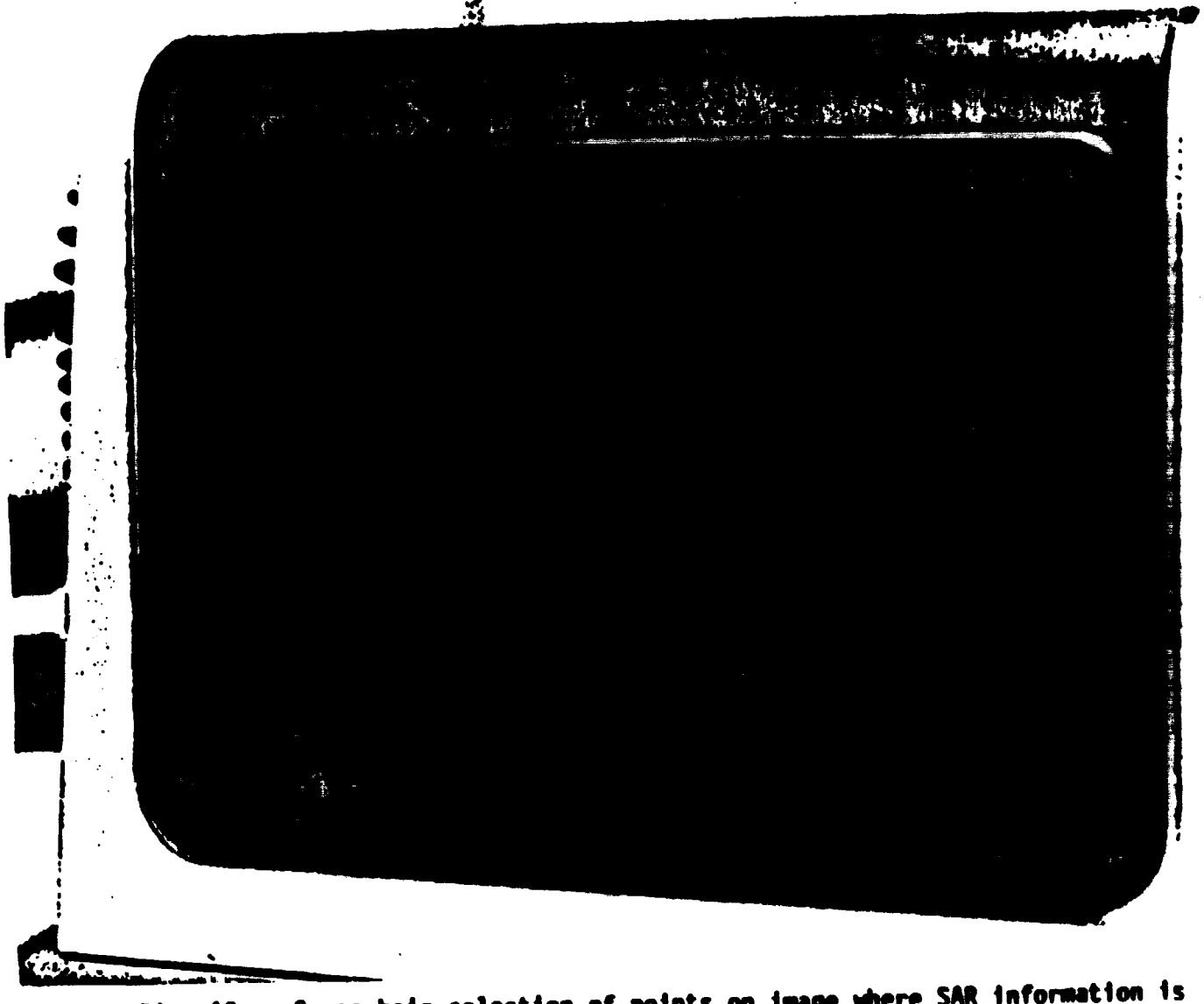

Fig. 13. Cross-hair selection of points on image where SAR information is desired.